45th SPACE WING

ENVIRONMENTAL QUALITY INDUSTRIAL

Patrick Air Force Base
Cape Canaveral Air Force Station
Ascension Auxiliary Airfield
Antigua Airfield
Malabar Tracking Annex
Jonathan Dickinson Missile
Tracking Annex

INTRODUCTION

Along Florida's Space Coast from which the vast Atlantic stretches east, the journey to space began years ago and continues today. The work of the 45th Space Wing comes together amid the pristine habitat of alligators and eagles at Patrick Air Force Base and nearby Cape Canaveral Air Force Station.

The 45th Space Wing (45SW) provides a new kind of flightline for the Air Force. An integral part of the space program since the 1950s, today's Cape Canaveral Air Force Station is an example of how the Air Force is moving into the 21st century guided by its vision of space power being a critical component of a lean, yet effective national defense force.

Headquartered at Patrick Air Force Base (PAFB), 20 miles south of Cape Canaveral Air Force Station (CCAFS), the 45th Space Wing supports air and space superiority, global attack capability, rapid global mobility, precision engagement ability, information superiority and agile combat support, and oversees launch operations for all Department of Defense space programs.

More than 3200 space launches have originated from the Cape with an average today of 34 launch operations per year. Launch customers include the Army, Navy, National Aeronautics and Space Administration (NASA), foreign governments, other AF and federal agencies and commercial companies. Support includes spacecraft processing, launch, tracking and safety.

Expendable launch vehicles include Delta, Atlas, Titan, Athena, Pegasus and the space shuttle and U.S. Navy submarine ballistic missiles.

Responsibilities of the 45SW are far-reaching. The wing's Eastern Range extends more than 10,000 miles downrange from the Florida mainland through the South Atlantic into the Indian Ocean. Facilities include 4,783 acres of tracking sites at the Malabar and Jonathon Dickinson Missile Tracking Annexes and downrange sites at Antigua Air Station and Ascension Auxiliary Airfield.

Coupled with the wing's mission of assured access to space, all 1,400 active duty military, 900 civil servants, 7,000 contractors and more than 30 tenant units, at all six installations, are committed to environmental excellence.

Covering almost 18,000 acres of sandy beaches, coastal sand dunes, wetlands and woodlands, and located on a barrier island between the Banana River and the Atlantic Ocean, Patrick and the Cape are home to 27 threatened and endangered wildlife species. PAFB covers 2,500 acres of land while CCAFS covers a 25-square mile area, or more than 15,000 acres along the East Coast of Florida.

A strong commitment to protecting these unique resources drives the 45th Space Wing's mission of excellence in environmental stewardship and shapes its goals of pollution prevention, natural and cultural resource conservation, cleanup and restoration and environmental planning and compliance.

BREVARD COUNTY

Brevard County, home of the 45SW, is well known as Florida's Space Coast. Both installations are bounded on the west by the Banana River and on the east by the Atlantic Ocean. Located three miles south of Cocoa Beach on a barrier island, Patrick is an hour and a half drive east of Orlando.

Looking north from Patrick along a shoreline that curves east like the arc of a soaring launch vehicle, CCAFS, one of the most famous pieces of real estate in the world, can be seen 20 miles away. Twenty-three communities are situated within Brevard County with a population of more than 413,900.

The Space Coast employment picture includes Fortune 500 companies, hi-tech corporations, medical businesses, educational facilities, aerospace companies, commercial and light industry and tourism.

The 45SW is one of the top 10 employers in the sixth fastest growing metro market in the nation. Annual payroll and local contract expenditures of approximately $600 million combined with the more than $3.5 billion of facilities, equipment and inventories, makes the 45SW one of Central Florida's major corporate citizens.

BACKGROUND

A strong commitment to excellence in environmental stewardship shapes 45SW goals and objectives.

CHALLENGES

The biggest environmental challenge facing the 45SW is to operate the most active space launch complex in the world today while protecting and preserving the environment.

In addition to operational considerations, the climate and extent of natural and cultural resources provide unique challenges. Due to barrier island influences and the effect of two climate zones, an ecosystem has evolved which is unique in the Northern Hemisphere.

Consequently, maintaining a fragile balance between hazardous rocket operations and the unique ecosystem, consistent with federal regulations, creates a challenging responsibility.

In addition to "hi-tech" mission influences, the 45SW constantly works in conjunction with Mother Nature. Facilities are plagued by tropical storms and hurricanes resulting in a continual battle to preserve the more than 14 miles of Atlantic beaches, natural habitats and mission critical resources. High temperatures and sparse rainfall add to the danger of wildfires, while the continuous onslaught of salt air creates an extremely corrosive atmosphere for historic and archeological sites.

The coastal oak scrub habitat, essential to the threatened Florida scrub jay, is a vanishing resource and the Cape is one of the largest remaining examples of this ecosystem identified by the U.S. Fish and Wildlife Service.

ORGANIZATION AND STAFFING

The 45th Civil Engineering Squadron's Environmental Flight, with 25 employees, has responsibility for environmental management and compliance issues at PAFB, CCAFS, Antigua AS, Ascension Auxiliary Airfield and the Malabar and Jonathan Dickinson Missile Tracking Annexes. Maximum coverage of all four AF environmental pillars: compliance, conservation, pollution prevention and restoration is ensured.

The staff is augmented with restoration contractors and an environmental service contractor, Vista Technologies, Inc., and its subcontractor, Dynamac Corporation, which employ 20 individuals at CCAFS.

The Environmental Protection Committee (EPC), chaired by the wing commander, plays a major role in the wing's environmental management program. The EPC is comprised of environmental personnel, group and squadron commanders as well as tenant organizations.

The wing's Restoration Advisory Board (RAB), comprised of citizens from across the county, plays an integral part in environmental activities and priorities. The 45SW actively solicits public stakeholders' environmental views and concerns.

MANAGEMENT APPROACH EMPLOYED

The 45SW management approach is centered on proactively preserving and protecting the environment while ensuring access to space.

From rescuing 15 threatened Great-Horned owl eggs from high atop launch structures, to controlling tiny mosquitoes, every aspect of the environment is considered.

While we must "react" as things occur, wing personnel aggressively pursue opportunities to prevent or avoid potential problems before they occur by employing tried and true or innovative solutions.

The environmental flight increases the understanding, cooperation and commitment of all personnel, both on and off base, through continual education, to ensure the environment and our heritage are intact long into the future.

The RAB is an invaluable tool in working with the general public. As stakeholders, the two-way flow of communication regarding the wings Installation Restoration Program (IRP), and other environmental issues, is essential.

The 45SW uses partnering teams extensively. A model for bases around the world, the IRP partnering team, and indeed the entire "team" approach, results in streamlined, more efficient and productive stewardship of our environmental heritage.

Restoration Advisory Board at FT-17

AIR FORCE AND COMMUNITY BOARDS AND COMMITTEES

The 45th Space Wing, Restoration Advisory Board, formed in 1995, currently hosts 28 members and plays an active role in cleanup activities. As liaisons between the local community and base officials, the board meets quarterly.

The 45th Space Wing Environmental Protection Committee ensures compliance and promotes the protection and preservation of the environment.

The 45th Space Wing Cape Environmental Team facilitates the dissemination of environmental information to personnel at the Cape.

Several employees have an active role in the Florida Association of Environmental Professionals, sharing knowledge and experience with other professionals across the community.

45SW environmental engineers actively participate in the Society of American Military Engineers providing briefings and exchanging information.

PARTNERSHIPS

The Installation Restoration Program partnering team includes members from the Department of Defense (DOD), Florida Department of Environmental Protection (FDEP), the U.S. Environmental Protection Agency (EPA) and IRP contractors. The team's productivity sets the standard for all US EPA Region IV and partnering teams throughout the DOD. Mutual respect and trust is garnered while operations are streamlined.

Always at the forefront, the IRP staff teamed with the Department of Energy (DOE), the U. S. Navy, the EPA and Armstrong Labs in conducting successful anaerobic dechlorination tests that will serve as a treatability protocol for more than 630 Air Force chlorinated solvent sites worldwide.

Visionary leadership led to the joint development of the International Dense Non-Aqueous Phase Liquid (DNAPL) International Consortium with the DOD, DOE, NASA and the EPA. This consortium entered into a Memorandum of Agreement (MOA) to test three innovative technologies at space launch complex 34 that will be the basis for chlorinated solvent cleanup worldwide!

Superb leadership paved the way in the joint development of a Land Use Control Agreement with FDEP and EPA to use industrial instead of residential cleanup standards. This cost-saving agreement is being exported across the nation!

The dynamic compliance partnering team promotes trust and understanding between regulatory agencies and the AF. The team, including the wing, NASA, FDEP, St. Johns Water Management District and Brevard County, streamline the permitting process and promote information exchange.

The wing partners with NASA and the State of Florida on compliance issues resulting in a 40% reduction in the number of construction permits for water and sewage. A Cape landfill closure cap requirement was reduced from 10 acres to 4 while reducing associated costs by $2 million!

A partnership with NASA and the National Park Service clarified responsibilities for managing seven areas listed in the Man in Space National Historic Landmark District.

ENVIRONMENTAL PLANS AND AGREEMENTS

While the volume of studies and plans can be overwhelming, they are essential to quality and consistently meeting regulatory requirements. The 45SW minimizes paperwork whenever possible, and keeps plans and agreements consolidated and current.

In addition to the plans and agreements outlined below, a tentative agreement with the U.S. Coast Guard for maintenance of the CCAFS lighthouse is in progress.

Whenever possible, the wing uses grants. A grant with the University of Central Florida Biology Department allows for monitoring sea turtle nesting activity on PAFB shores and is in effect until September 2001.

Another grant with The Nature Conservancy annually monitors the Florida scrub jay nesting and population success at CCAFS and is reinitiated annually (valid until September 2000.)

In addition to the controlled burning plan, the wing has had a cooperative agreement with the US Fish & Wildlife Service to provide annual support for conducting vegetative burns on CCAFS since 1995.

PLAN/AGREEMENT NAME	DATE LATEST VERSION
Storage Tank Management Plan	1998
Pollution Prevention Management Action Plan	1999
Petroleum Products and Hazardous Waste Management Plan	1998
Integrated Solid Waste Management Plan	1999
Integrated Hazardous Material Response Plan	1997
PCB Plan	1996
Petroleum Cleanup Agreement with FDEP	1998
Integrated Natural Resources Management Plan for PAFB	1995-2000
Integrated Natural Resources Management Plan for CCAFS	1997-2002
Cultural Resources Management Plan	1996-2001
CCAFS Outdoor Recreation Plan	1997
Geographical Information Systems Implementation Plan	1997
CCAFS Pest Management Plan	1999
MOA for preservation of theater & chapel	1996
MOA with Kennedy Space Center	1997
Interagency Agreement with Kennedy Space Center	1998
MOA with FDEP	1999
MOA with FDEP	1999
Management Action Plan (PAFB IRP)	1999
Management Action Plan (CCAFS IRP)	1999
MOA with US EPA and FDEP	1999
Risk Management Plan	1999
MOA with US EPA and FDEP	1999

PROGRAM SUMMARY

The overall objective of the 45th Space Wing environmental program is to support the Air Force mission of assured access to space while protecting and preserving the environment.

During the last two fiscal years the wing received no violations and individual element and flight objectives were met or exceeded in an award-winning manner.

The most outstanding feature of the 45th Space Wing's environmental program is the ability to protect, preserve and remain outstanding stewards of the environment given the space mission and unique environmental considerations at each of six different locations.

The 45th Space Wing's environmental program is unique primarily due to the overarching space launch mission and the many environmental facets. The program goes beyond just meeting statutory and regulatory requirements by "going the extra mile" in all areas. Personnel continually look for better, more efficient ways to accomplish tasks and meet challenges through partnering and innovative technologies.

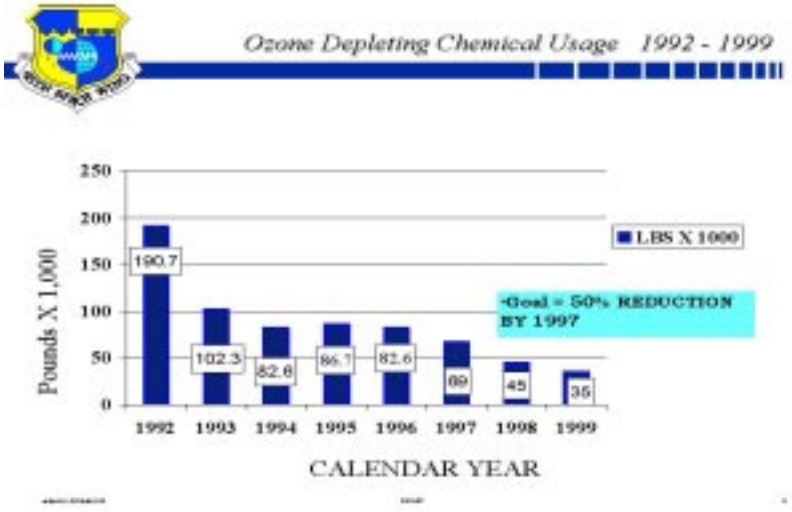
PROGRAM ACCOMPLISHMENTS

Air Pollution Control

Protection of air quality at 45SW facilities is accomplished through a comprehensive program that includes separate Title V Air Operating Permits for PAFB and CCAFS. These permits designate seven general areas of air emissions: boilers; generators; paint spray booths; sandblast yards; hypergolic fuel and oxidizer handling systems; solvent cleaning systems; and fugitive volatile organic compound emissions. By expertly documenting emissions, the FDEP agreed to exempt 63 emission units with potential emissions or heat inputs below the Title V reporting threshold as insignificant emissions units.

Through aggressive process changes and product substitution reduction of Toxic Release Inventory chemicals was achieved.

A 13% wing-wide reduction in Class I ODS substances from 1998 was achieved by converting an air conditioning system from Class I to Class II ODS returning 3,000 lbs. of Class I ODS to supply. Total reductions from the 1992 baseline were a remarkable 81%!



Use of trichloroethane decreased from 39,889 pounds in 1997 to 12,169 pounds in 1999, an incredible 69% reduction! More than 30% of halon-containing fire suppression systems were replaced with non-ozone depleting substances. Forty-four fuel oil-fired boilers were converted to natural gas to reduce greenhouse gases such as sulfur dioxide and nitrogen oxides.

Process modifications totally eliminated 20,922 pounds of Freon 113. Wing-wide painting operations were targeted for process improvements to reduce hazardous air pollutants. Sixteen high-velocity, low-pressure paint guns, eight recirculating paint gun washers and three solvent recyclers were purchased and saved $113,000 in material purchases and disposal costs.

A critical Risk Management Plan was submitted to the EPA in June 1999 outlining hazards associated with potential releases of listed commodities into the atmosphere. The plan details quantities of commodities and potential release scenarios, in-place safety measures to ensure accidents are avoided, and emergency response procedures. Wing personnel involved all required organizations, including the Brevard County Emergency Management and NASA. A dynamic public meeting incorporating seven other county organizations was held to provide full disclosure and reassurance that contingencies were adequately evaluated.

Water Pollution Control

A state-of-the-art, 800,000 gallons per day, regional wastewater treatment facility (WWTF) at CCAFS became operational in January 1997. This facility consolidates 13 different waste streams from permitted treatment facilities on CCAFS and receives wastewater from a facility that pretreats bilge and shipboard wastewater from the Navy Wharf area.

An innovative disinfection system uses ultraviolet radiation in lieu of chlorine was instituted at the Cape WWTF. Nitrate removal equipment was installed to protect shallow groundwater and sensitive ecosystems.

Wing personnel aggressively partnered with NASA to connect the Kennedy Space Center (KSC) wastewater system to the Capes regional wastewater treatment facility resulting in reduced costs to both agencies.

The 45SW expertly conducted a comprehensive water study to assess water systems at PAFB and CCAFS. These studies led to $5 million in projects to repair and upgrade facility water systems.

An aggressive reuse program virtually eliminated potable water irrigation within the industrial complex at the Cape.

The 45SW redirected industrial wastewater discharges from the Banana River to a sanitary sewer system to improve river water quality.

An old potable water distribution piping at Antigua AS was replaced with a double-looped system. This new system provides consistent residual chlorine levels and eliminates bacteria. Procedures were developed to sanitize portions of the distribution system under emergency repair. Projects to install pollutant monitoring and detection capability at the rainwater collection basin and potable water treatment facility were programmed. Tablet chlorinators replaced gaseous chlorine to eliminate this hazardous substance.

The Antigua Air Station wastewater treatment system was revamped with new coating, blowers, flowmeter and lab equipment. The newly constructed vacuum-assisted sludge drying bed made sludge handling odorless and efficient. Fertilizer and bioremediation agents are two ingenious methods of reusing the dried sludge cake.

Noise Pollution Control

Although PAFB and CCAFS experience noise from traditional jet flying activities, noise pollution control at 45SW facilities takes on a new challenge.

The sometimes-deafening rumble of space launches is considered an everyday part of Space Coast life. However, wing officials take special precautions to minimize overpressure (sound) waves by using a computerized model called BLAST. The BLAST model measures the intensity of overpressure (sound) waves resulting from atmospheric conditions in the event of an inadvertent anomaly while a space launch vehicle is in flight. If the overpressure wave prediction exceeds established criteria, the launch is held.

In addition to the BLAST model, space launch complexes are equipped with water deluge systems to aid in sound suppression upon lift-off.

Traditional flying activities also impact off-base areas. PAFB, in cooperation with the AF Center for Environmental Excellence Air Installation Compatible Use Zone (AICUZ) team, recently revised the AICUZ report to reflect current operational procedures and activities.

Study results indicated noise contour patterns impacting off-base areas are substantially reduced from those shown in 1979 and 1993 studies. These reductions directly reflect on-going efforts to use flight patterns and practices to control undesirable noise.

Base planning and redevelopment efforts are aimed at eliminating facilities and functions in undesirable high noise AICUZ contours. These efforts include revised land zones that limit facility development to noise compatible areas. Policies are outlined in the recently revised general plan. Several major MILCON projects programmed for FY01 will relocate facilities.

Radiation Pollution Control

Health Physics support at CCAFS and PAFB crosses the entire spectrum from contingency support for space launch of multi-curie sources to day-to-day activities necessary to control occupational hazards of high-powered lasers, radar tracking stations, industrial radiography and medical x-rays.

The most technically challenging aspect of the 45SW's radiation pollution control program is supporting the launch of payloads with large, multi-curie radioactive sources onboard. Planing for the Cassini mission spanned two years. The 45SW was responsible for planning and executing the operational radiation safety program and the contingency support plan involved 500,000 curies of plutonium.

Specific tasks included developing the radiation safety plan; oversight of daily radiation protection surveillance at the Cape; organizing a multi-agency contingency task force of more than 50 individuals; representing the wing commander in meetings with state and county emergency planners and the general public; and briefing the president's science and technology advisor.

In addition to space launch missions, the 45SW has a wide range of ionizing and non-ionizing radiation sources. There are approximately 95 registered users of radiation on the installation, including radioactive material sources, high-powered lasers and radars.

While the contractor accomplishes routine surveillance of these users at the Cape, the wing is the principle evaluator of major source uses at all facilities and performs all routine and special surveillance at Patrick. About 20 radiation use authorization requests and approximately 15 survey reports are handled monthly.

There are six major radiation users at PAFB requiring annual assessment and seven minor users that are assessed less frequently. In addition, tracking radars at six downrange sites ranging from Antigua and Ascension Island in the Atlantic Ocean, to Shemya Air Base and the USNS Observation Island in the Pacific, to Argentia in Greenland are evaluated every other year.

Waste Management and Resource Recovery

Reducing solid waste generation is the goal of the 45SW solid waste management program. The development of new processes, combined with outstanding recycling and recovery programs, ensured attainment of reducing, reusing and recycling goals. The wing's outstanding 37% solid waste diversion rate exceeded the FY99 Air Force diversion rate by 22%!

The 45SW's unique location on a sensitive and highly regulated Atlantic coast barrier island makes beach preservation a major concern. Consistent with dedication to environmental stewardship, the wing spearheaded four beach cleanups removing 72 tons of trash from 14 miles of beach. An amazing 85% was recycled with 300 people participating!

A new can-crusher prevented 30,000 pounds of recyclable metal including used oil filters, steel paint cans and aerosol cans, from being disposed in a landfill. This initiative saved $18,700 in disposal costs in the first two years and generated $1,000 in revenues from used oil filter sales.

Recycling opportunities were expanded to include cardboard, CD-ROMs, plastic, laser toner and ink-jet printer cartridges, oil filters, paint cans and solvent/aerosol containers. This substantially reduced the solid waste

stream by eliminating 60,000 pounds of material from landfill disposal and avoiding $2,000 in disposal costs. Approximately 5.6 million pounds of material was recycled in FY99 with an 8% increase in volume. A state-of-the-art Material Recycling Facility, completed in November 1998 contributes to recycling while direct sales authority enabled a substantial increase in revenue.

The wing partnered with Brevard County and recycled more than 15,000 pounds of telephone books.

Approximately 60 million pounds of concrete debris was recycled by crushing it into aggregate for reuse in roadway stabilization and construction of facilities supporting the nation's newest space initiative — the Evolved Expendable Launch Vehicle program. Landfill disposal was eliminated and $5.6 million in fees saved. The purchase of thousands of dollars of virgin base material was eliminated.

About two million pounds of railroad ties and utility poles were shredded saving $50,000 in disposal costs. The resulting mulch was used as landfill cover and to improve exercise trails.

Base contracts and environmental impact analysis statements were reviewed ensuring affirmative procurement and solid waste diversion statements were included.

Proactive implementation of Executive Order 13101, the Defense Logistics Agency's "Closed Loop Re-refined Oil Program", requires use of re-refined oil in all government vehicles. As a result, the wing's used motor oil disposal costs were reduced by $1,000 per year. The useful life of oil was significantly extended in all special purpose and heavy equipment vehicles by purchasing 84 secondary oil filtration systems and an engine oil analyzer. This generated a savings of $6,000 annually.

The recreational boat dock utilized 100% recycled plastic wood in its replacement while 250 gallons of excess paint was redistributed downrange.

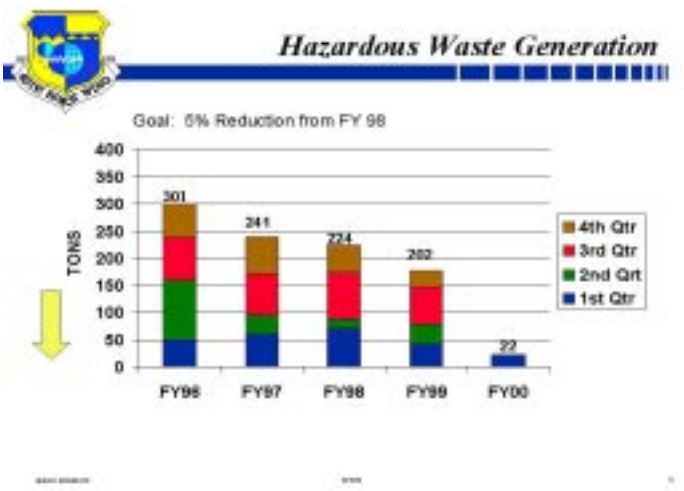
Wood pallets previously sent to a landfill for disposal are now reused for shipments of material to Ascension Auxiliary Airfield and Antigua AS.

At Ascension, 500,000 pounds of scrap steel and a 22,000-pound anchor were returned to the CONUS for resale or recycling. In addition, lead acid vehicle batteries and uninterruptable power supplies, Ni-cad batteries, electron tubes, transformer carcasses, oil/fuel filters, 332 smoke detectors, 1,500 fluorescent tubes, 18 miles of lead-encased copper cable and non-PCB ballast's were recycled instead of

Concrete Recycling

sent to landfills.

Hazardous Material, Toxic and Hazardous Waste Management



Operating the world's busiest launch base generates a wide variety of hazardous waste including rocket fuel. The 45SW continually reviews waste management practices to find better and less expensive methods of management.

Large quantities of oxidizer scrubber liquor is generated from launches. However, through an aggressive hazardous waste management program, hazardous waste generation was reduced from 546,000 pounds in FY 97 to 318,000 pounds in FY 99; a 41% decrease!

There are approximately 100, less than 90-day and satellite accumulation sites on CCAFS and PAFB. Each generator and accumulation site is inspected quarterly for regulatory compliance.

There are two Subpart B permitted hazardous waste storage facilities on the Cape with a total 14,520-gallon capacity, and a 4,595-gallon capacity facility on Patrick. Explosive ordnance is treated at an interim permitted Subpart X thermal treatment unit on CCAFS. The FDEP and EPA found no violations during annual permitted facility inspections during the last seven years.

An impressive reduction of EPA's 17 chemicals by 67%; class I ozone depleting substances by 81%; and AF listed pesticides by 68% from 1992 baseline figures was achieved.

90-Day Accumulation Site

Fast-tracking the cleanup of 7,300 tons of polychlorinated biphenyl (PCB)-contaminated soil at SLC-37 and SLC-41 allowed a new space launch program to stay on track with construction. Innovative strategy in using rail cars for soil disposal saved $500,000 and reduced project completion time by five months.

The removal and retrofilling of all PCB transformers was completed prior to the AF 31 Dec 98 deadline. This dramatically reduced costs and delays by retrofilling 17 mission-critical transformers when replacement would have caused a delay of 6-12 months at a cost of several million dollars. A mission-critical transformer containing 5,500 gallons of PCB oil was retrofilled without mission impact.

A meticulous PCB survey at Ascension and Antigua, focused funding on updating old telemetry and communications. A PCB management plan was developed and hundreds of fluorescent light fixture PCB ballasts were replaced.

Ascension Auxiliary Airfield

The AF hazardous materials authorization process identified chemicals and materials not identified by technical orders that could be substituted with less hazardous alternatives. Shop assessments validated process changes and reduced hazardous material usage: paint products by 630 gal/yr; solvent usage by 1,023 gal/yr; and oil by 484 gal/yr. A preliminary list of 44 materials to be exempted from the authorization/tracking process due to their consumer commodity packaging and minimal health and environmental risks was developed.

Energy costs were reduced with conversion of 44 #2 fuel oil boilers and electric water heaters to natural gas. The compressed natural gas fueling facility, accommodating wing duel-fueled vehicles, was completed.

The “clean” closure of three old hazardous waste storage facilities on CCAFS was completed.

Universal waste, central accumulation areas for Ni-cad batteries and fluorescent lamps were developed. Recycling of these commodities eliminated two hazardous waste streams totaling more than 25,000 pounds annually. Written procedures were provided to generators outlining correct packaging prior to turn-in. The wing recycles batteries through participation in the Rechargeable Battery Recycling Council and reaps annual cost savings of $3,500.

Equipment to reduce the volume of solvents used in spray-painting operations from 800 gallons per year to less than 500 gallons per year was installed with a projected 3-year savings of $76,000.

Yearlong efforts reduced toxic release inventory chemicals from two to one during the last year while the inventory report was submitted well before the deadline.

Forty organizations participate in the wing’s Hazardous Material Pharmacy (HAZMART).

Solvent Recycling

The HAZMART tracks 767 items, stocks 159 items and drastically cuts down on hazardous materials used and hazardous waste generated.

The quality of the 45SW program is enhanced by compliance partnering with the FDEP and NASA along with AF and NASA contractors. Partnering is used to address issues and find solutions to items such as marking of new waste stream containers prior to sampling and during the determination process; management of hazardous waste records during hurricanes, and; determination of the cause of bulging paint waste drums.

Approximately 75,000 pounds of hazardous waste was eliminated saving $13,000 annually as a result of process reviews. This was achieved by changing the method of shipping concentrated mixed hydrazine fuels (MHF) for disposal.

The wing philosophy in fighting and conquering hazardous waste is to minimize hazardous material used. Eighty-five percent of hazardous waste at Ascension is generated from corrosion control operations. Hazardous waste was dramatically minimized by reducing surfaces requiring painting by metallizing barracks, no-maintenance textured block in new and renovated structures, using baked-on powder coating on pipes and roofs and using stainless steel roofs.

Wire arch metalization of steel antennas provides a zinc metal coating that reduces corrosion control from several times a year to once every 15 years. This process eliminated 2,000 pounds of hazardous waste per year.

Ascension Auxiliary Airfield developed a unique solution to an on-going problem. Waste oil is transferred to the British Power Production Facility on the island rather than being shipped back to CONUS, eliminating 40,000 pounds of waste per year and saving $5,500 in disposal charges.

Pest Management

The 45SW's pest control facilities and pest management programs are far-reaching and innovative. Pest management plans are aggressively updated and incorporate recent developments in pesticide technology to minimize toxic chemical usage. Hurculean efforts were made to deal with pesky pests in the most economically and environmentally friendly manner possible.

Innovative ideas led to reduced chemical pesticides usage. For example, 70 bat houses were installed around wing facilities and housing to provide pesticide free mosquito control. These bat houses increased insect predation from these nocturnal flying mammals and reduced the mosquito population with zero use of pesticides.

The wing resourcefully handled an increased rodent population by adopting cats from the local humane society. These cats were saved from euthanasia, sterilized, vaccinated, tagged and given homes in facilities. In return they contribute their instinctive inclination to hunt thus controlling the rodent population in a pesticide free manner.

The wing ramrodded elimination of restricted-use pesticides in favor of state-of-the-art unrestricted-use pesticides and spearheaded a base-wide survey for termites and other pests. A fumigation project was designed to combat a pervasive, base-wide, drywood termite infestation epidemic.

Environmental Research and Awareness

PAFB and CCAFS are two of the most active testing grounds for new innovative cleanup technologies in the AF. More than 28 different technologies were tested at 15 different sites. These tests provided $3 million in free cleanups and more than 105 million pounds of contaminated soil was removed.

A $5 million, leading edge technology, solvent-extraction and washing system was implemented. This innovative technology successfully cleaned a complex site contaminated with PCBs, chlorinated solvents and petroleum products and minimized the waste stream saving $5 million. One of the first horizontal air sparging systems in the nation was installed to halt a chlorinated solvent plume and protect a designated manatee and dolphin sanctuary. A follow on project restored 3,000 plants.

A plan is in place to close or begin remedial actions for all sites by FY05, ten years ahead of the AF goal of FY15. The wing also led Space Command by executing more than $20 million in restoration projects! The flight conducted facility investigations at 39 sites and closed 16 areas of concern at three installations.

Prior to extensive PCB soil cleanup, threatened and endangered species, including 35 southeastern beach mice and 36 gopher tortoise, were relocated. More than 14 million pounds of PCB-contaminated soil at two sites were cleaned allowing construction of the nations newest space launch program to stay on track. Tortoise relocation surveys were completed at seven space launch complexes prior to remedial actions with 100 tortoises actually relocated.

There are 27 threatened and endangered species located on wing facilities. More than 240 animals were relocated from

construction zones in support of mission critical projects.

Endangered sea turtle protection activities include an aggressive light management plan to minimize hatchling disori-

entation. No hatchling disorientation's were reported from more than 7,000 nests and 651,000 hatchlings as documented by the $16,000 sea turtle nesting index project through the University of Central Florida.

Ospreys were nesting on mission-critical antennas and launch towers so thirty-one alternate nesting platforms were built to encourage nesting away from equipment.

The GIS database is an integral component of 45SW environmental research tools. Information from 20 post-launch surveys was incorporated and culturally significant resources are identified on the Arcview GIS for use in master planning.

An aggressive $1.2 million beach renourishment and dune crossover repair project was completed.

A 54-acre tract of dormant wetlands is being restored by removing berms that previously blocked the natural flow of water into a site from the adjacent Banana River.

Through a partnership with ground maintenance personnel, PAFB and CCAFS have achieved National Arbor Foundation Tree City status since 1993.

Approximately 9,000,000 pounds of steel was recycled along with precious metals, pipes and concrete. The meticulous removal of a 50/15-ton crane allowed it to be resold for $700,000 instead of salvaging the material. Fourteen pressure vessels were reused elsewhere generating a savings of $2 million. Other steel structures are being used to create an artificial fishing reef in partnership with the U.S. Coast Guard and local agencies.

Archeological sites are a great concern with investigations revealing 11 of 16 sites surveyed are eligible for listing in the National Register of Historic Places. Six sites are also considered to be of cultural significance because of the presence of human remains.

In conjunction with the U.S. Fish and Wildlife Service and the Florida Department of Forestry, the wing cleared and burned more than 900 acres of land to increase the habitat for the third largest population of endangered Florida scrub jays with 333 individual scrub jays and 125 groups. Although the population is considered to be in peril statewide, enhancement of the CCAFS scrub habitat is lauded by regulators as a model for other landowners.

Environmental flight personnel experimented with hydrocarbon contamination treatment in pilot plots using two types of microbes. Personnel learned parameters for successful landfarming in the dry, hot Ascension Island climate.

A new vacuum-assisted sludge drying bed was constructed. Sludge handling is now odorless and more efficient. Ingenuity prevails with dried sludge cake used as fertilizer, bioremediation or easily disposed.

Environmental Education

The 45SW has a wide variety of programs that teach and enhance environmental awareness:

- provided affirmative procurement training;
- training for hazardous material purchases by IMPAC card holders; conducted shop process reviews;
- provided first-ever pollution prevention opportunity assessment workshop,
- develops quarterly environmental newsletters for distribution to more than 500 local community residents;
- designed/distributed 11 information pamphlets and coloring book; distributed nationwide; developed recycling brochures and flyers to housing residents to encourage full participation;
- wrote and published 55 environmental news articles and conducted 60 speaking engagements to schools, specialized groups/conferences/meetings, community events and national conferences; designed displays for 45 on and off-base events;
- conducted briefings and site tours to RAB members, media, schools and Air Force Institute of Technology (AFIT) classes; routinely briefs at AFIT;
- conducted several interviews with media;
- responsible for creating and updating environmental and total CE web page;
- developed an administrative record search database for IRP program;
- Environmental and Energy Awareness Week celebration provided three days of 50

Environmental & Energy Awareness Week
45SW and NASA

private, state and federal recycling educational displays — more than 1200 on and off-base attendees;

- researched, developed and narrated pollution prevention informational video; coordinated with local utility company on training video for prevention of future Native American Indian site desecration's;
- jam-packed 2nd Annual America Recycles Day celebration; wing and 19 corporations provided educational displays, 2,000 attendees;
- briefs and trains RAB;
- conducted tours of historic homestead sites for Brevard County Historical Society;
- hazardous waste training on EPA's military munitions rule provided;
- personnel assisted the Darwin Institute of the University of Wales, Swansea UK, at Ascension in a green sea turtle nest survey; personnel walked beaches during off-duty hours to record turtle crawls and nesting activity; exterior light fixtures were re-lamped with low-pressure sodium bulbs to decrease turtle hatchling disorientation;
- employees at Antigua became involved in Antigua Humane Society, Environmental Awareness Group and Historical and Archeological Society; personnel excavated colonial and pre-Columbian artifacts displayed at the St. John's Natural History Museum; teamwork converted the remains of the 1737 Betty's Hope Plantation sugar mill into a museum and tourist site; supported communities after the hurricane and Montserrat volcano eruption; and,

- presented a comprehensive paper of multi-year trends for sea turtle nesting, depredation and disorientation rates and sponsored 'turtle walks" for wing and contractor personnel.

Environmental Compliance Assessment and Management Program

There are no open enforcement actions at any 45SW installations, despite 22 formal inspections at PAFB and CCAFS during award period.

Two internal Environmental Compliance Assessment and Management Program (ECAMP) inspections were done at the Cape, two at Antigua AS, two at Ascension Auxiliary Airfield and two at PAFB. All findings at Patrick were closed.

A full-time ECAMP program manager closely monitors the program and ensures it is a day-to-day, ongoing process. Continual training is done on all aspects of environmental compliance as well as in conducting actual inspections. Assessment workbooks were developed and used during internal inspections. Approximately $30,000 is saved on internal ECAMPs conducted with in-house resources.

An aggressive partnering program was implemented with regulatory agencies, including the development of a tiered hierarchy for discussion of issues before they result in non-compliance notices. CCAFS is currently working with the FDEP on a pilot program, high-profile electronic reporting system that is a direct outgrowth of the partnering concept.

Personnel worked tirelessly with commercial entities in developing comprehensive lease agreements that incorporate environmental compliance initiatives and insight.

During FY99, CCAFS completed design, and began construction of substantial water distribution system improvements in response to open items under a previous ECAMP inspection. These $4.2 million projects include installing an effective base-wide loop system in order to complement the water deluge system and avoid stagnant conditions in the water lines. Backflow prevention and additional sampling ports, in conjunction with pump station improvements and ammoniation injection ports, will ensure acceptable residual chlorine levels are maintained throughout the system.

Going "above and beyond", the wing formed a Cape Environmental Team to enhance environmental operations and compliance at CCAFS. This group disseminates information to thousands of personnel on CCAFS and provides a network for environmental professionals. This team is vital as commercialization of space launch activities increases by ensuring cooperation at the grass roots level.

Dynamic partnering initiated between the AF, NASA and the State of Florida resulted in a 30-40% reduction in the number of construction permits for water and sewage projects.

The 45SW and NASA joined together, through the Joint Base Operations Support Contract, providing low-cost health, safety and environmental training with certifications issued.

Extremely informative, quarterly Environmental Protection Committee (EPC), provides senior wing management updated information on compliance status, initiatives and environmental planning and conservation activities. ECAMP activities are closely monitored by tracking findings, progress and closure.

National Environmental Policy Act (NEPA)

Approximately 150 design packages were reviewed ensuring environmental initiatives were included early in project design.

AF Form 813's are diligently reviewed, identifying compliance and mitigation requirements to avoid costly mission

critical delays. Early consultation with project proponents, planners/designers and environmental regulators ensure incorporation of initiatives and mitigation.

The wing has a responsive rate of 99% for AF Form 332 reviews and 98% for AF Form 813 preparations. All forms were processed and returned to launch customers within 10 days of submittal.

A comprehensive matrix of past NEPA documentation aids in the timely analysis of newly proposed actions and eliminates repetitive analysis.

Completion record for NEPA analysis of military construction projects is outstanding. Environmental analysis process documentation is completed at least two years prior to project award thus avoiding mission delays. Project changes are addressed in a supplemental document just prior to award.

A streamlined document flow system ensures customers receive timely review and guarantees insertion of environmental initiatives at the earliest stages of new launch program development.

A newly established Environmental Impact Analysis Process (EIAP) Working Group educates proponents, identifies actions, streamlines processes and supports Eastern Range customers. Partnering with NASA, the Space and Missile Center, Boeing, Lockheed Martin, Spaceport Florida, Space Gateway Support and others, ensures environmental considerations included in new projects.

A joint planning initiative with NASA assessed environmental impacts at CCAFS and KSC for proposed future land use. This included consulting with federal, state and local planning agencies as well as launch customers to steer AF development plans in best support of long-range goals. The need for repetitive documentation for future construction activities was reduced while streamlining the environmental review process for activities located in designated planning zones.

Personnel monitored environmental effects of 37 space launches on air, water and soil and incorporated the results into environmental analysis documents for future launch activities from CCAFS.

EIAP aids in the wing's outstanding protection of natural resources. The wing evaluated 1,100 individual tasks and prepared 220 AF Form 813s for natural resource impacts. Conscientious processing of 5 environmental impact statements, 2 environmental assessments and 36 environmental baseline surveys minimized natural resource impacts.

Tireless review of historic sites ensured legitimacy and preservation requirements. Investigations revealed a previously listed site was not eligible for the National Register of Historic Places. Personnel reviewed 120 construction projects and design reviews for potential impacts to historic cultural sites.

Outstanding support of the next generation of space launch vehicles was demonstrated by expediting coordination with the State Historic Preservation Office on construc-

tion of a mission critical power substation.

Through close coordination with a launch customer, a highly publicized and potentially controversial project to implode the mobile service and umbilical towers at space launch complex 41 was completed. This project helped pave the way for the nation's newest space launch vehicle, the Evolved Expendable Launch Vehicle program.

Complex 41, Mobile Service Tower and Umbilical Tower Implosion

Environmental Justice

Expert compliance with Executive Order 12898, environmental justice analysis, is incorporated into all environmental programs, policies and actions. Environmental justice is used in all environmental impact assessments for the wing while identifying and analyzing any disproportionate impacts on minority or low-income communities, as appropriate.

The tireless NEPA team, with proponents and project engineers, meet mission requirements while incorporating significant environmental improvements in design packages at the earliest stages of project development. In addition, construction sites are expertly monitored to ensure mitigation activities occur and are as effective as possible.

COMMITMENT

The men and women of the 45th Space Wing are committed to environmental excellence. Although challenges were met and exceeded in an outstanding manner during the last two years, the heart of this successful program goes back many years.

Commitment to the environment extends both on and off-base, to military and civilian alike, with a vow to protect human health and the environment. Partnering activities with the local community and regulators have added substantially to this success.

The 45th Space Wing's commitment to the Air Force mission and environmental stewardship can be summed up with one phrase:

"Our mission is space. Our responsibility…the earth."